Treatm nt of animal diarrhoea

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Abstract

A veterinary composition useful for treatment of energy depletion, dehydration and electrolyte imbalance in diarrhoeic neonatal animals consisting essentially of (a) glucose in an amount sufficient to produce a concentration level of from greater than 200 nM to 250 mM when in an aqueous solution, (b) one or more sodium salts in an amount sufficient to produce a sodium ion concentration level of from 60 mM to 120 mM when in an aqueous solution, and (c) one or more chloride salts in an amount sufficient to produce a chloride ion concentration level of 50 mM to 90 mM when in an aqueous solution.

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Description

The present invention relates to a veterinary composition useful for the treatment of diarrhoeic neonatal animals.

Acute diarrhoeal diseases in animals particularly neonatal calves are amongst the most important causes of morbidity and mortality. Diarrhoea results in the loss from the animal of large quantities of water rich in bicarbonate, sodium, chloride and potassium. The animal thus becomes dehydrated, and the blood becomes more acidic. Continued feeding of milk to diarrhoeic neonatal animals may worsen the diarrhoea.

It is known from, for example, US-A-4164568, that certain substances such as glucose, galactose and some amino acids (e.g. glycine) are actively absorbed from the intestine into the bloodstream and that simultaneous enhancement of water absorption occurs with the uptake of these substances. Glucose is the most readily available of these substances. Accordingly, it is known in the prior art to stop feeding milk to calves suffering from diarrhoea and treat them with solutions containing glucose at a concentration required for sufficient water absorption (110-160mM glucose).

It is also known that sodium (Na^+) and chloride (Cl^-) are required for maximum absorption of glucose and water across epithelial cells. Accordingly, it is also known to treat animal diarrhoea with electrolytes to increase water absorption and to replace losses of these substances in the faeces.

Rotavirus and cryptosporidia which cause direct epithelial damage and result in malabsorption diarrhoea are the most common causes of calf diarrhoea worldwide. In these infections malnutrition is as much, if not more of a consideration than dehydration. Moreover, energy requirements of neonatal calves kept outdoors in winter or spring are likely to be high. Other species such as pigs are highly susceptible to death from reduced energy intake in the neonatal period when diarrhoea is common. Recent investigations have shown that prior treatments for neonatal diarrhoea may lead to animals becoming severely hypoglycaemic and moribund.

It is accordingly an object of the present invention to overcome or at least alleviate, some of the difficulties and deficiencies related to the prior art.

According to the present invention in a first aspect, there is provided a veterinary composition suitable for the treatment of energy depletion, dehydration and electrolyte imbalance in diarrhoeic neonatal animals, which comprises glucose, one or more sodium salts and one or more chloride salts, the composition being characterised in that glucose is present in the composition in an amount sufficient to produce a concentration level of from 200 mM to 250 mM/ℓ when in an aqueous solution, sodium salt is present in the composition in an amount sufficient to produce a sodium ion concentration level of from 60 mM to 120 mM/ℓ when in an aqueous solution, and chloride salt is present in the composition in an amount sufficient to produce a chloride ion concentration level of 50 mM to 90 mM/ℓ when in an aqueous solution.

In a second aspect of the present invention, there is provided a veterinary aqueous solution comprising glucose, sodium (Na^+) ions, and chloride (Cl^-) ions, the composition being characterised in that the glucose concentration is in the range 200 mM to 250 mM/ℓ, the sodium ion concentration is in the range 60 mM to 120 mM/ℓ and the chloride ion concentration is in the range 50 mM to 90 mM/ℓ.

The veterinary composition according to the present invention may be in oral dosage form.

The veterinary composition according to the present invention may be in the form of a solution. An aqueous solution is preferred. Desirably the composition may be provided in a solid or powder form for transport. The end user may then form the composition into an aqueous solution.

The amount of glucose which may be included in the composition should provide sufficient energy for survival of scouring calves in all prevailing weather conditions. The minimum energy requirement will vary. However, at least 50% of the normal maintenance energy requirements of the neonatal calf should be provided.

Accordingly, a concentration level of not less than 200mM/ℓ glucose in aqueous solution form is required taking into consideration the appetite of neonatal calves. It will be understood that the concentration of glucose should be as high as possible to provide the calf with sufficient nutrition. However, the level of glucose is limited as a complicating fermentative diarrhoea may occur if too great a level of glucose is used. Glucose concentrations of up to 250mM/ℓ may be safely used if sufficient sodium is also provided. The glucose concentration should not be beyond an upper limit of 250mM/ℓ.

Glucose may be present in the form of anhydrous dextrose or dextrose monohydrate. In order to achieve the concentrations specified above, dextrose monohydrate may be present in the veterinary compositions in amounts of from approximately 39g to 50g per litre of the final aqueous solution.

The anhydrous dextrose may be present in amounts of from approximately 35g to 45g per litre of the final aqueous solution.

Sodium (Na^+) ions are included in the solution primarily to couple with glucose to draw water from the

gut lumen into the body and secondly to replace increased sodium losses in diarrhoeic faeces. Sodium ions are thus very important in minimising dehydration, one of the principle effects of diarrhoea, and in maximizing glucose uptake thus preventing hypoglycemia and fermentative diarrhoea. A minimum concentration of 60mM/ℓ sodium is required for maximum glucose and water absorption from a 200-250mM/ℓ glucose solution. Faecal sodium (Na^+) losses in diarrhoeic calves are usually in the order of 40mM although they may be as high as 89 to 137mM. Accordingly, the concentration of sodium ions in the veterinary composition may vary from 60 to 120mM/ℓ sodium ions.

Chloride (Cl^-) ions are also included in the solution to promote water absorption and to replace faecal losses. Chloride ion losses are understood in general to parallel those of sodium ions. It will be understood that full replacement of chloride ions is not considered essential. Chloride must be present as the major anion for maximum water absorption, however part of the chloride ions replacement may be substituted by other anionic electrolytes as discussed below. Accordingly, a suitable range of chloride ion concentration in the veterinary composition according to the present invention may be from 50 to 90mM/ℓ aqueous solution form.

The preferred source of sodium ions and chloride ions is sodium chloride (NaCl). However, other sources of such ions may be used.

Sodium Chloride (NaCl) may be present in the veterinary compositions in amounts of from approximately 3.5g per litre to 5.2g per litre of the final aqueous solution.

The veterinary composition according to the present invention may further include:

(d) a source of bicarbonate (HCO_3-) ions. Bicarbonate ions may be introduced into the composition as sodium bicarbonate ($NaHCO_3$). Bicarbonate ions may be of benefit to animals which are in an advanced state of acidosis when treatment has commenced. A solution containing 40mM/ℓ bicarbonate has been found to be useful in diarrhoeic calves without affecting palatability. Accordingly, a range of 20 to 40mM/ℓ bicarbonate concentrations may be included in an aqueous solution of the veterinary composition according to the present invention.

Bicarbonate ions as sodium bicarbonate ($NHCO_3$) may be present in an amount of from approximately 1.7g to 3.4g per litre of the final aqueous solution.

The veterinary composition according to the present invention may further include:

(e) a source of citrate ions.

Citrate ions may be included in the composition according to the present invention as they have a two-fold effect. Firstly they may be used partially or completely in place of bicarbonate ions. Secondly they may be used at very low concentration levels in order to increase fluid uptake across the gut wall. Thus a concentration of 1 to 35mM/ℓ of citrate ions may be included in an aqueous solution of the veterinary composition according to the present invention. However, the sum of bicarbonate and citrate concentrations should not exceed 40mM/ℓ so that chloride stimulated water absorption is not interfered with. The source of citrate ions may be sodium citrate.

In a particular preferred form, the veterinary composition may include an aqueous solution of 227mM/ℓ glucose, 86mM/ℓ sodium (Na^+) ions and 86mM/ℓ chloride (Cl^-) ions.

This is equivalent to approximately 45g/1 glucose and 5g/1 NaCl.

In a preferred form, the veterinary composition may comprise

(a) 88% w/w to 94% w/w of glucose monohydrate baded on the total weight of the veterinary composition;

(b) 6% w/w to 12% w/w of sodium chloride based on the total weight of the veterinary composition.

In a further preferred form, the veterinary composition may comprise:

(a) 83% w/w to 92% w/w of dextrose (anhydrous) based on the total weight of the veterinary composition;

(b) 5% w/w to 11% w/w of sodium chloride based on the total weight of the veterinary composition; and

(c) 3% w/w to approximately 8% w/w of sodium bicarbonate based on the total wight of the veterinary composition.

In order to achieve the desired ion concentration the veterinary composition including dextrose monohydrate may be present in an aqueous solution in amounts of approximately 44.1 to 58.1g per litre. The veterinary composition including dextrose (anhydrous) may be present in amounts of approximately 40.5 to 53.6gm per litre.

The veterinary composition may be in the form of an aqueous solution for oral administration.

The veterinary composition may be administered twice daily. The veterinary composition may be administered in amounts of 1.5 to 2 litres depending on the size of the calf, (smaller amounts would be suitable for piglets). Th treatment may continue for two days during which milk should not be fed. The veterinary composition may then be administered as a mixture of composition and milk. The mixture may

be an 1:1 volume/volume mixture.

For example, 0.75 litres of solution may be mixed with 0.75 litres of milk and administ red to the animal twice daily for two days.

Alternative the veterinary composition may be administered on alternate feedings to an approximately equivalent volume of milk.

The invention will now be more fully described with reference to the accompany example.

EXAMPLE 1

PROPORTIONS OF INGREDIENTS

A - Using dextrose monohydrate; no sodium bicarbonate

Ingredient	mM	g/litre solution	g/kg powder	Comment
(i) Max glucose min NaCl				
Dextrose M.H.	250	49.5	*934	Min NaCl limited
NaCl	60 + 60	3.5 conc.	* 66	by min Na+
Total	370	54.0	1000	
(ii) Min glucose max Nacl				
Dextrose M.H	200	39.6	*884	Max NaCl limited
NaCl	90 + 90	5.2	*116	by max Cl - conc
Total	380	44.8	1000	
(iii) Max Powder mixture/litre				
Dextrose M.H.	250	49.5		
NaCl	90 + 90	5.2		
Total	430	*54.7g/l		
(iv) Min Powder mixture/litre				
Dextrose M.H.	200	39.6		
NaCl	60 + 60	3.5		
Total	320	*43.1g/l		

B - Using dextrose monohydrate and sodium bicarbonate

Ingredient	mM	g/litre solution	g/kg powder	Comment
(i) Max glucose				
Dextrose MH	250	49.5	*915	
NaCl	50 + 50	2.9	54	
NaHCO3	20 + 20	1.7	31	
Total	390	54.1	1000	
(ii) Min glucose				
Dextrose MH	200	39.6	*832	Amt.NaCl limited
NaCl	80 + 80	4.6	97	by max Na+ (120mM)
NaHCO3	40 + 40	3.4	71	
Total	440	47.6	1000	
(iii) Max NaCl				
Dextrose MH	200	39.6	822	
NaCl	90 + 90	5.2	*108	
NaCHO3	40 + 40	3.4	70	
Total	460	48.2	1000	
(iv) Min NaCl				
Dextrose MH	250	49.5	887	
NaCl	50 + 50	2.9	*52	
NaHCO3	40 + 40	3.4	61	
Total	430	55.8	1000	

(v) Max NaHC03

Dextrose MH	200	39.6	863
NaCl	50 + 50	2.9	63
NaHC03	40 + 40	3.4	*74
Total	420	45.9	1000

(vi) Min NaHC03

Dextrose MH	250	49.5	878
NaCl	90 + 90	5.2	92
NaHC03	20 + 20	1.7	*30
Total	470	56.4	1000

(vii) Max Powder Mixt./litre soln.

Dextrose	250	49.5	Amount of NaCl limited
NaCl	80 + 80	4.6	by max Na+ conc (120mM)
NaHC03	40 + 40	3.4	
Total	490	*57.5g/l	

(viii) Min Powder Mixt/litre soln

Dextrose MH	200	39.6
NaCl	50 + 50	2.9
NaHC03	20 + 20	1.7
Total	340	*44.2g/l

C - Using anhydrous dextrose; no sodium bicarbonate

Ingredient	mM	g/litre solution	g/kg powder
(i) Max glucose min NaCl			
Anh Dextrose	250	45.0	*928
NaCl	60 + 60	3.5	*72
Total	370	48.5	1000
(ii) Min glucose max NaCl			
Anh Dextrose	200	36.0	*874
NaCl	90 + 90	5.2	*126
Total	380	41.2	1000
(iii) Max Powder mixt./litre			
Anh Dextrose	250	45.0	
NaCl	90 + 90	5.2	
Total	430	*50.2g/l	
(iv) Min Powder mixt./litre			
anh Dextrose	200	36.0	
NaCl	60 + 60	3.5	
Total	320	*39.5g/l	

D - Using anhydrous dextrose and sodium bicarbonate

Ingredient	mM	g/litre solution	g/kg powder	Comment
(i) Max glucose				
Dext anh.	250	45.0	*907	
NaCl	50 + 50	2.9	59	
$NaHCO_3$	20 + 20	1.7	34	
Total	390	49.6	1000	
(ii) Min glucose				
Dext.anh	200	36.0	*818	
NaCl	80 + 80	4.6	105	
$NaHCO_3$	40 + 40	3.4	77	
Total	440	44.0	1000	
(iii) Max NaCl				
Dextrose anh	200	36.0	807	
NaCl	90 + 90	5.2	*117	
$NaHCO_3$	40 + 40	3.4	76	
Total	460	44.6	1000	
(iv) Min NaCl				
Dextrose anh	250	45.0	877	
NaCl	50 + 50	2.9	*57	
$NaHCO_3$	40 + 40	3.4	66	
Total	430	51.3	1000	

(v) Max $NaHCO_3$

Dextrose anh	200	36.0	851
NaCl	50 + 50	2.9	69
$NaHCO_3$	40 + 40	3.4	*80
Total	420	42.3	1000

(vi) Min $NaHCO_3$

Dextrose anh	250	45.0	867
NaCl	90 + 90	5.2	100
$NaHCO_3$	20 + 20	1.7	*33
Total	470	51.9	1000

(vii) Max powder mixt./litre soln

Anh Dextrose	250	45.0
NaCl	80 + 80	4.6
$NaHCO_3$	40 + 40	3.4
Total	490	*53.0g/l

(viii) Min powder mixt./litre soln

Anh Dextrose	200	36.0
NaCl	50 + 50	2.9
NaHC)$_3$	20 + 20	1.7
Total	340	*40.6g/l

1 Kg of the veterinary compositions A, B, C, D, were prepared by mixing together the ingredients in dry powder form.

EXAMPLE 2

A veterinary composition according to the present invention in the form of an aqueous solution containing 227mM glucose, 86mM Na^+ and 86mM Cl-/l was fed to calves which became diarrhoeic following infection with rotavirus and cryptosporidia.

Other calves were fed with electrolyte only or electrolyte glycine, glucose mixtures having compositions as set out in Table 1. Diarrhoeic calves (12) were deprived of milk and fed 1.5 litres of the solution alone twice daily for 2 days, then fed 0.75 litres of the solution with 0.75 litres milk twice daily for 2 days. Calves treated with the solution became significantly less acidotic ($P<0.02$ days 2-4) and less dehydrated ($P<0.05$ days 1-3) than control diarrhoeic calves (12) fed 1.5 litres milk twice daily.

The effects of such tr atments on acidosis and dehydration of calves are set out in Figures I and II Table 2 also shows the number of calves in each group found to be moribund. From a review of these Figures it will be noted that diarrhoeic calves fed a commercial electrolyte-only solution or a commercial solution containing glucose (125mM/l), glycine and electrolytes also became significantly less acidotic and dehydrated than milk fed controls. However, some calves in both these treatment groups became severely hypoglycaemic and moribund. Diarrhoeic calves continued on milk and given an oral antimicrobial became significantly more acidotic ($P<0.05$ days 1.2) than diarrhoeic control calves fed milk alone.

In the trials calves were allotted to treatment groups with consideration to immunoglobulin status, bodyweight, initial severity of diarrhoea and initial degree of acidosis and dehydration. Under these circumstances the new veterinary composition according to the present invention was effective in minimising acidosis, dehydration and hypoglycaemia in calves infected with rotavirus and cryptosporidia. None of the calves died in the new solution treatment group during the experiments but calves died with severe hypoglycaemia in the two other milk deprived treatment groups (Figure 4). Although the number of deaths are too small for significance data, blood changes in the milk-deprived moribund calves indicate the glucose/energy content of currently available solutions is too low.

Table 1

CALF SCOUR TREATMENTS

Composition (mM)	Electrolyte	Glyc/Glyc. Electrolyte	W.H.O. Recommendation	New Solution
Glucose	-	111	110	227
Glycine	-	41	-	-
Na^+	50	74	90	86
Cl^-	48	74	80	86
HCO_3^-	24	-	30	-
K^+	43	17	25	-
PO_4^-	9	17	-	-
Citric acid	-	1	-	-
Osmolality -	174	335	335	399

Table 2

Calf Scour Trials 2 and 3 - Moribund calves

	Milk	Milk + Antimicr.	Electrolyte (trolyte)	Nutr/Elect (Wytrate)	New Soln.	
No.moribund calves	1/12	5/12	2/11	2/11	0/12	
Blood pH (norm.7.40)	7.15	6.92	7.19	6.82	-	†acidosis
Blood urea(mM)	28.4	25.8	16.6	19.4	-	†dehydration
Glucose (normal 2.8 - 7.5mM)	1.5	7.3	0.5	0.3	-	†hypoglycaemia

Claims

1. A veterinary composition suitable for the treatment of energy depletion, dehydration and electrolyte imbalance in diarrhoeic neonatal animals, which comprises glucose, one or more sodium salts and one or more chloride salts, the composition being characterised in that glucose is present in the composition in an amount sufficient to produce a concentration level of from 200 mM to 250 mM/ℓ when in an aqueous solution, sodium salt is present in the composition in an amount sufficient to produce a sodium ion concentration level of from 60 mM to 120 mM/ℓ when in an aqueous solution, and chloride salt is present in the composition in an amount sufficient to produce a chloride ion concentration level

of 50 mM to 90 mM/ℓ when in an aqueous solution.

2. A veterinary composition as claimed in Claim 1 characterised in that it also includes one or more bicarbonate salts in an amount sufficient to produce a bicarbonate ion concentration level of 20 mM to 40 mM/ℓ when in an aqueous solution.

3. A veterinary composition as claimed in Claim 1 or Claim 2 characterised in that it also includes one or more citrate salts in an amount sufficient to produce a citrate ion concentration level of 1 mM to 35 mM/ℓ when in an aqueous solution.

4. A veterinary composition as claimed in Claim 1 characterised in that is consists of 88% w/w to 94% w/w of glucose monohydrate based on the total weight of the veterinary composition, and 6% w/w to 12% w/w of sodium chloride based on the total weight of the veterinary composition.

5. A veterinary composition as claimed in Claim 2 characterised in that it consists of 83% w/w to 92% w/w of glucose anhdydrous based on the total weight of the veterinary composition, 5% w/w to 11% w/w of sodium chloride based on the total weight of the veterinary composition, and 3% to 8% w/w of sodium bicarbonate based on the total weight of the veterinary composition.

6. A veterinary composition as claimed in Claim 1 characterised in that it consists of 87% w/w to 93% w/w of dextrose (anhydrous) and 7% w/w to 13% w/w of sodium chloride based on the total weight of the veterinary composition.

7. A veterinary composition as claimed in Claim 2 characterised in that it consists of 81% w/w to 91% w/w of dextrose (anhydrous) based on the total weight of the veterinary composition, 5% w/w to 12% w/w of sodium chloride based on the total weight of the veterinary composition, and 3% w/w to 8% w/w of sodium bicarbonate based on the total weight of the veterinary composition.

8. A veterinary solution consisting of a composition as claimed in any one of Claims 1 to 7 in the form of an aqueous solution.

9. A veterinary aqueous solution as claimed in claim 8 comprising glucose, sodium (Na+) ions, and chloride (Cl-) ions, the composition being characterised in that the glucose concentration is in the range of 200 mM to 250 mM/ℓ the sodium ion concentration is in the range 60 mM to 120 mM/ℓ and the chloride ion concentration is in the range 50 mM to 90 mM/ℓ.

10. A veterinary aqueous solution as claimed in Claim 9 characterised in that the aqueous solution composition further comprises bicarbonate (HCO_3-) ions at a concentration in the range of 20 mM to 40 mM/ℓ.

11. A veterinary aqueous solution composition as claimed in Claim 9 or Claim 10 further characterised by citrate ions in the range of 1 mM to 35 mM/ℓ.

Revendications

1. Un composé vétérinaire convenant au traitement de la déplétion, de la déshydratation et du déséquilibre en électrolytes chez les animaux nouveaux-nés souffrant de diarrhées, et comportant du glucose, un ou plusieurs sels de sodium et un ou plusieurs sels de chlore, le composé étant caractérisé en ce que ~~que le glucose est présent dans le composé en~~ quantité suffisante pour donner un niveau de concentration de 200 mM à 250 mM/l en solution aqueuse, le sel de sodium est présent dans le composé en quantité suffisante pour donner un niveau de concentration en ions sodium de 60 mM à 120 mM/l en solution aqueuse et un sel de chlore est présent dans le composé en quantité suffisante pour donner un niveau de concentration de ions chlorure de 50 mM à 90 mM/l en solution aqueuse.

2. Un composé vétérinair suivant la revendication 1 caractérisé en ce qu'il comporte aussi un ou plusieurs sels de bicarbonate en quantité suffisante pour donner un niveau de concentration d'ions bicarbonat de 20 mM à 40 mM/l en solution aqueuse.

3. Un composé vétérinaire suivant la revendication 1 ou la revendication 2 caractérisé en ce qu'il comporte aussi un ou plusieurs sels de citrate en quantité suffisante pour donn r un niveau de concentration d'ions citrate de 1 mM à 35 mM/l en solution aqueuse.

4. Un composé vétérinaire suivant la revendication 1 caractérisé en ce qu'il qu'il comporte 88 % en poids à 94 % en poids de monohydrate de glucose en fonction du poids total du composé vétérinaire, et 6 % en poids à 12 % en poids de chlorure de sodium en fonction du poids total du composé vétérinaire.

5. Un composé vétérinaire suivant la revendication 2 caractérisé en ce qu'il qu'il se compose essentiellement de 83 % en poids à 92 % en poids de glucose (anhydre) en fonction du poids total du composé vétérinaire, et de 5 % en poids à 11 % en poids de chlorure de sodium en fonction du poids total du composé vétérinaire et 3 % à 8 % en poids de bicarbonate de sodium en fonction du poids total du composé vétérinaire.

6. Un composé vétérinaire suivant la revendication 1 caractérisé en ce qu'il qu'il comporte 87 % en poids à 93 % en poids de dextrose (anhydre) en fonction du poids total du composé vétérinaire.

7. Un composé vétérinaire suivant la revendication 2 caractérisé en ce qu'il qu'il comporte 81 % en poids à 91 % en poids de dextrose (anhydre) et 7 % en poids à 13 % en poids de chlorure de sodium en fonction du poids total du composé vétérinaire, 5 % en poids à 12 % en poids de chlorure de sodium en fonction du poids total du composé vétérinaire et 3 % en poids à 8 % en poids de bicarbonate de sodium en fonction du poids total du composé vétérinaire.

8. Une solution vétérinaire consistant en un composé suivant l'une quelconque des revendications 1 à 7 sous la forme de solution aqueuse.

9. Une solution aqueuse vétérinaire suivant la revendication 8 comportant du glucose, des ions sodium (Na^+) et des ions chlorure (Cl^-), le composé étant caractérisé en ce que la concentration de glucose se situe dans la gamme de 200 mM à 250 mM/l, la concentration d'ions sodium se situant dans la gamme de 60 mM à 120 mM/l, et la concentration d'ions chlorure se situant dans la gamme de 50 mM à 90 mM/l.

10. Une solution aqueuse vétérinaire suivant la revendication 9 caractérisée en ce que le composé en solution aqueuse comporte également des ions bicarbonate (HCO_3-) à une concentration se situant dans la gamme de 20 mM à 40 mM/l.

11. Un composé en solution aqueuse vétérinaire selon revendication 9 ou revendication 10, caractérisée en outre par des ions citrate qui se situent dans la gamme de 1 mM à 35 mM/l.

Ansprüche

1. Eine tierarzneiliche Zusammensetzung, die zur Behandlung von Energieverlust, Dehydration und gestörtem Elektrolytgleichgewicht bei diarrhoealen neugeborenen Tieren geeignet ist und Glukose, ein oder mehrere Natriumsalze und ein oder mehrere Chloridsalze enthält. Die Zusammensetzung ist dadurch gekennzeichnet, daß sie ausreichend Glukose enthält, um in wässriger Lösung einen Konzentrationsspiegel von 200 mM bis 250 mM/l zu erzeugen, daß sie ausreichend Natriumsalz enthält, um in wässriger Lösung einen Natriumionen-Konzentrationsspiegel von 60 mM bis 120 mM/l zu erzeugen und daß sie ausreichend Chloridsalz enthält, um in wässriger Lösung einen Chloridionen-Konzentrationsspiegel von 50 mM bis 90 mM/l zu erzeugen.

2. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 1, die dadurch gekennzeichnet ist, daß sie zusätzlich ein oder mehrere Bikarbonatsalze enthält und zwar in der nötigen Menge, um in wässriger Lösung einen Bikarbonationen-Konzentrationsspiegel von 20 mM bis 40 mM/l zu erzeugen.

3. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 1 bzw. Anspruch 2, die dadurch gekennzeichnet ist, daß sie zusätzlich ein oder mehrere Zitratsalze enthält und zwar in der nötigen Menge, um in wässriger Lösung einen Zitrationen-Konzentrationsspiegel von 1 mM bis 35 mM/l zu erzeugen.

4. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 1, die dadurch gekennzeichnet ist, daß sie nach dem Gesamtgewicht der tierarzneilichen Zusamm nsetzung g rechnet zu zwischen 88% w/w und 94% w/w aus Glukosemonohydrat besteht und nach dem Gesamtgewicht der tierarzneilich n Zusammensetzung gerechnet zu zwischen 6% w/w und 12% w/w aus Natriumchlorid besteht.

5. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 2, die dadurch gekennzeichnet ist, daß sie nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 83% w/w und 92% w/w aus Glukose (anhydr.) besteht, nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 5% w/w und 11% w/w aus Natriumchlorid besteht und nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 3% w/w und 8% w/w aus Natriumbikarbonat besteht.

6. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 1, die dadurch gekennzeichnet ist, daß sie nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 87% w/w und 93% w/w aus Dextrose (anhydr.) besteht.

7. Eine tierarzneiliche Zusammensetzung gemäß Anspruch 2, die dadurch gekennzeichnet ist, daß sie nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 81% w/w und 91% w/w aus Dextrose (anhydr.) und zu zwischen 7% w/w und 13% w/w aus Natriumchlorid besteht, nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 5% w/w und 12% w/w aus Natriumchlorid besteht und nach dem Gesamtgewicht der tierarzneilichen Zusammensetzung gerechnet zu zwischen 3% w/w und 8% w/w aus Natriumbikarbonat besteht.

8. Eine tierarzneiliche Lösung, die aus einer Zusammensetzung gemäß eines der Ansprüche 1 - 7 in Form einer wässrigen Lösung besteht.

9. Eine tierarzneiliche wässrige Lösung gemäß Anspruch 8, die Glukose, Natrium (Na^+)-Ionen und Chlorid (Cl^-)-Ionen enthält, wobei die Zusammensetzung dadurch gekennzeichnet ist, daß die Glukosekonzentration im Bereich von 200 mM bis 250 mM/l, die Natriumionenkonzentration im Bereich von 60 mM bis 120 mM/l und die Chloridionenkonzentration im Bereich von 50 mM bis 90 mM/l liegt.

10. Eine tierarzneiliche wässrige Lösung gemäß Anspruch 9, die dadurch gekennzeichnet ist, daß die Zusammensetzung der wässrigen Lösung weiterhin Bikarbonat (HCO_3)-Ionen in einer Konzentration im Bereich von 20 mM bis 40 mM/l enthält.

11. Eine tierarzneiliche wässrige Lösung gemäß Anspruch 9 bzw. Anspruch 10, die weiterhin durch Zitrationen im Bereich von 1 mM bis 35 mM/l gekennzeichnet ist.

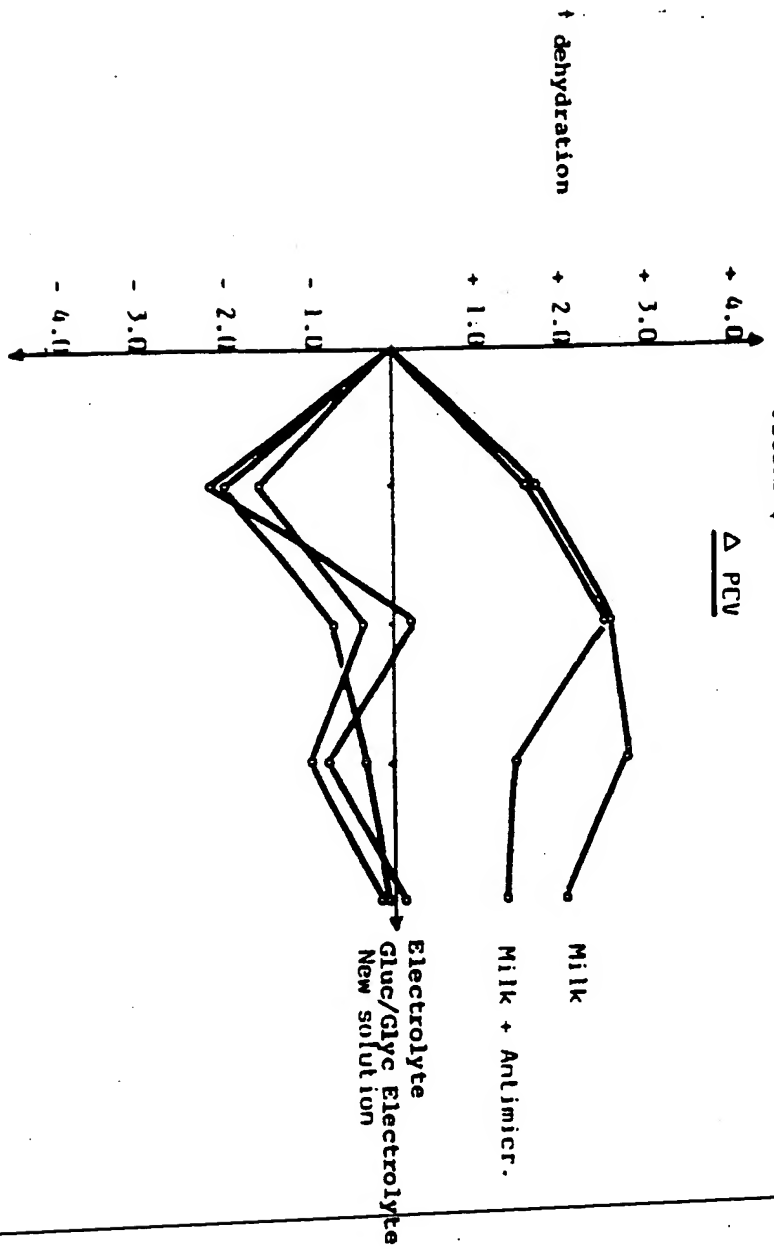
+ 4.0
+ 3.0
+ 2.0
+ 1.0
- 1.0
- 2.0
- 3.0
- 4.0
↑ dehydration
Δ PCV
Milk
Milk + Antimicr.
Electrolyte
Gluc/Glyc Electrolyte
New solution

FIGURE 1

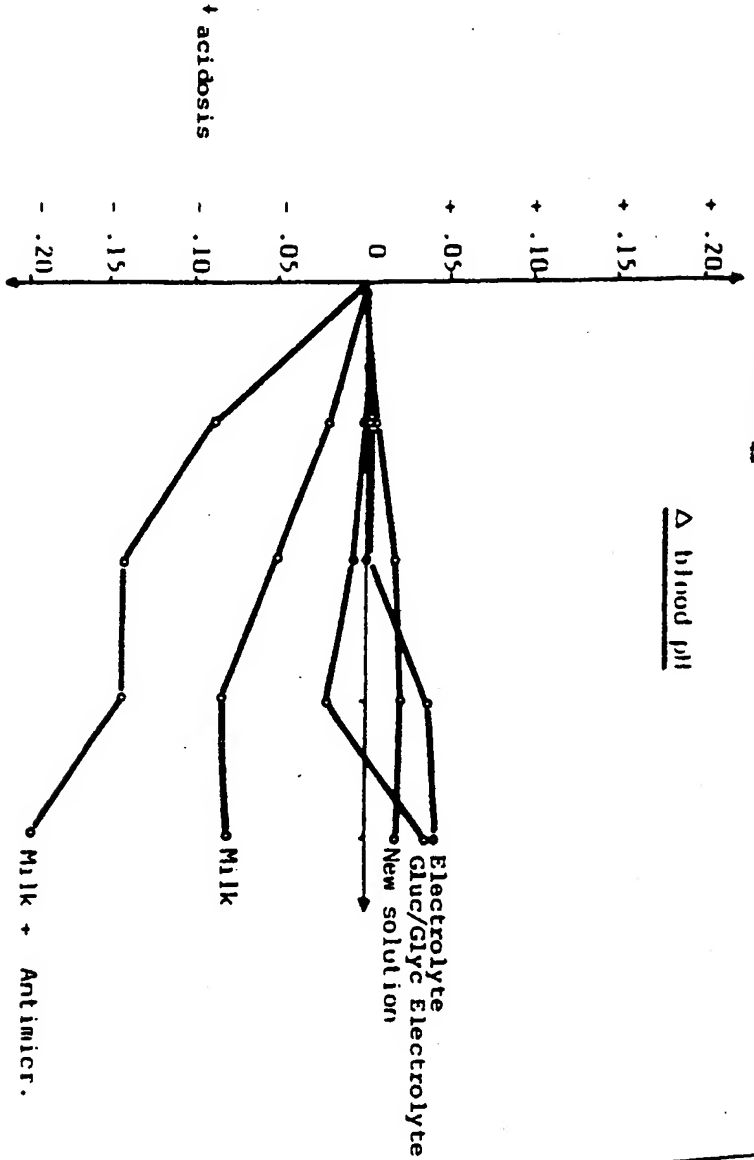
+ .20
+ .15
+ .10
+ .05
0
- .05
- .10
- .15
- .20
+ acidosis
Δ blood pH
Milk + Antimicr.
Milk
New solution
Electrolyte Gluc/Glyc Electrolyte

FIGURE II